UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/576,278	04/18/2006	Haruhiko Habuta	2006_0569A	9094

52349 7590 03/13/2009

WENDEROTH, LIND & PONACK L.L.P.
1030 15th Street, N.W.
Suite 400 East
Washington, DC 20005-1503

EXAMINER	
VERDERAME, ANNA L	

ART UNIT	PAPER NUMBER
1795	

MAIL DATE	DELIVERY MODE
03/13/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/576,278	HABUTA ET AL.	
	Examiner	Art Unit	
	ANNA L. VERDERAME	1795	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *05 December 2008*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *25-31* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *25-29 and 31* is/are rejected.

7)☒ Claim(s) *30* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *18 April 2006* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/27/2008 and 1/5/2009*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

The amendment filed on 12/05/2008 has been carefully considered. A response is presented below.

Claim Rejections - 35 USC § 112

1. Claims 25-29 and 31 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Claim 21 recites wherein M_k is at least 2 atom % greater than $M_{k-1}(1 \leq k \leq n)$. In the case where K=1 M_{k-1} is zero. However, there is not a zero-th recording layer. K should be defines as $1 < K \leq n$. Claims 26-29 and 31 depend from claim 25.

Claim Objections

2. Claim 30 is objected to because of the following informalities: Claim 30 depends from cancelled claim 16 and should be deleted. Appropriate correction is required.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. Claims 25-29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kitaura et al. US 2002/0022105 in view of Uno et al. WO 2004/027770(US 2005/0253210 used as an English language translation) and Yasuda et al. US 6,221,455.

Kitaura et al. 2002/0022105 teaches a single layer optical recording media in figures 1-2 comprising a Te,O,M recording layer 3 and a dielectric layer 2. The dielectric layer can be placed on either side of the recording layer 3(0037). Figure 3 teaches a dual-layer optical recording layer comprising a first information layer 7, a separation layer 8, a second information layer 9 and a protective layer 4. Here at least the first information layer 7 or the second information layer 9 comprises a dielectric layer 2 and a recording layer 3(0038). Media having 2 to six layers can be formed(0027). A four layer medium is shown in figure 7(emphasis added).

The dielectric layer 2 is made of a material having a refractive index not less than 1.5. Examples of materials for the protective layer include ZnS, TiO_2, ZrO_2, Si, SiC, Si_3N_4, GeN or the like as the main component is suitable. Depending on the wavelength and the optical constant of each layer, it is preferable to determine the thickness to be in the range between $0.31\lambda/n$ and $0.5\lambda/n$ where in a wavelength of an optical beam used for recording and reproduction is λ and a refractive index of the dielectric layer 2 is n(0040).

The wavelength used for recording is not more than 500 nm(0028). N is preferably 2.5 or more(0040). If a wavelength of 400 nm is used for recording and the refractive index of the protective layer is 2.5 than the minimum thickness for the recording layer $0.31\lambda/n$ is 48 nm and within the range taught in claim 6.

As the material for the recording layer a material containing Te, O, and M wherein M is one or more elements selected from Al, Si,Ti, V, Cr, Mn, Fe, Co, Ni, Cu, Zn, Ga, Ge, Zr, Nb, Mo, Ru, Rh, Pd, Ag, In, Sn, Sb, Hf, Ta, W, Re, Os, Ir, Pt, Au, and Bi

can be used. It is preferable that M is Pd or Au since a sufficient crystallization speed and high environmental stability can be obtained(0041). A preferable composition range for the recording layer 3 is from 25 to 60 atomic percent for O-atoms and from 1 to 35 atomic percent M-atom(0042). The recording layer has a thickness in the range of 5 nm to 70 nm(0029).

The reference discusses the results caused by adjusting the O-atom concentration and the M-atom concentration respectively (0043-0044). In an area where the O-atom in the recording layer is contained in an amount of 25 atomic percent or less a thermal conductivity of the layer is too high so that recording marks become too large. Thus even if the recording power is enhanced the C/N ratio does not rise. On the other hand in an area where the O-atom concentration in the recording layer exceeds 60 atomic percent, a thermal conductivity of the recording layer becomes too low so that recording marks cannot be formed large enough even by enhancing the recording power. Thus the C/N ratio is low and the sensitivity also is insufficient(0043). In an area where M-atom in the recording layer 3 is contained at less than 1 atomic percent the function of promoting crystal growth is low and the crystallization speed in the recording layer is insufficient so that marks can not be formed at a high recording speed. On the other hand in an area where the M-atom concentration exceeds 35 atomic percent a reflectance change between the amorphous and the crystalline phase deteriorates so that the C/N ratio is low(0044).

In regard to the limitation of instant claim 15 which requires annealing of the recording layer at a temperature of 60°C or higher for at least five minutes after the recording layer had been formed, this limitation is taught in Kitaura et al at (0013).

Uno et al. teaches a multi-stack optical recording medium like that shown in table 1. Thicknesses for the protective layers and the recording layers of each recording stack are disclosed in table 1. The thicknesses of the recording layers and the protective layers are within the ranges recited in the instant claims. The fourth recording stack has a 40 nm reflective layer [(WO pages 24—25)/(US 0075). The recording layer contain Te-O-Pd [(WO page 22 lines 1-10)/(US 0072)]. The reflective layer is Al-Cr [(WO page 22 line 17)/(US 0074)].

Yasuda et al. teaches a multi-layer optical recording medium wherein preferred materials for the recording layer include TeO_x where $0<x<2$ whose relative stability in the crystalline state and is favorable in securing thermal stability of the recording pit(10/10-13).

The reference further teaches that in a multi-layered disc the first information layer is made of a material having a higher transmittance(lower reflectance) so that sufficient light is able to access the second and subsequent recording layers(8/28-43). Layers nearer the light incident plane must exhibit sufficient reflectance as well has sufficient transmittance. Layers lying remoter to the light incidence plane must have

high reflectance and high absorbency to enable sufficiently high playback signal amplitude from the recording pit(10/32-63).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the multi-layer information recording media taught by Kitaura et al. by forming the dielectric layers to have a thickness in the range of between 3nm to 50 nm as recited in instant claim 21 and to form an Al-Cr reflective layer in the recording layer furthest from the light incidence plane based on the disclosure in Kitaura et al. at 0028 and 0040 and based on the example of Uno et al. Further, it would have been obvious to one of ordinary skill in the art to modify the multi-layer recording medium by adjusting the amount of metal added to each of the recording films within the acceptable range of 1 to 35 atomic percent M-atom recited in Kitaura et al. so that the recording layer closest to the light incidence plane are more transmissive than those further from the light incident plane based on the teachings found in Yasuda et al. and with the reasonable expectation of forming an optical recording medium in which the recording sensitivity is increased due to the addition of metal and in which recording layers further from the light incident plane are accessible. One way this can be achieved is by having the metal content (and a result the reflectivity) of the layers further from the light incidence plane be greater that the content found in those nearer the light incidence plane.

The experimental modification of this prior art in order to ascertain optimum operating conditions fails to render applicants' claims patentable in absence of unexpected results. In re Aller, 105 USPQ 233. One of ordinary skill in the art would have been

motivated to adjust the amounts of metal in each of the recording films within the recited range of Kitaura et al. and further would have been motivated to adjust the transmittance and reflectivities of the recording layers in such a way that the reflectivity of layers nearer to the light incidence plane is less that that of layer further from the light incidence plane based on the disclosure in Yasuda. Effects of adding metal to the Te-O film are taught in Kitaura(0043-0044). It is further the position of the examiner that another result of adding more metal or less metal to a material such as the Te-O film is a subsequent increase (more metal) or decrease(less metal) in reflectivity. Also a change in recording sensitivity is disclosed as being associated with the amount of metal present in the film. A prima facie case of obviousness may be rebutted, however, where the results of the optimizing variable which is known to be result-effective, are unexpectedly good In re Boesch and Slaney 205 USPQ 215.

Response to Arguments

3. Applicant's arguments filed 12/05/2008 have been fully considered but they are not persuasive.

On page 5 of the response the applicant argues that the disclosure of Kitaura et al. is not relevant because the reference does not disclose optical recording media having more than 2 layers. This is incorrect. Kitaura et al. discloses media having 2 to six layers can be formed(0027). A four layer medium is shown in figure 7(emphasis added).

On page 5 the applicant disputes the teachings of Uno et al. because Uno et al. discloses that the concentration of metal atoms in the first recording layer may be higher than that in the second through nth layer. Uno et al. has examples where this is the case. However, Uno et al. is used for its teachings regarding the structure of a multilayer recording media having Te-O-M as the recording layer material. It is further noted that the reference still recognizes the need for the transmittance of layers closer to the light incidence plane to be higher than those further away. See (0024, 0030) .

The references clearly disclose thickness of the recording layer and metal content of the recording layer as being result effective with respect to the transmissivity of the layer. A thin layer will be more transmissive than a thicker layer and a layer having a higher metal content will be more reflective(less transmissive) than a layer having a lower metal content. The reference further discloses that it is desirable to control transmissivity of layer nearer to the light incidence plane so that layers further from the light incidence can be accessed. Metal content and layer thickness also are disclosed as effecting the recording properties of the layers. One of ordinary skill in the art would be motivated to optimize metal content and layer thickness in order to obtain a layer having adequate transmissivity and good recording properties. The applicant has the burden of showing that manipulation of these quantities yields unexpected results not recognized by the prior art. In the alternative the applicant can show unexpectedly good results when the metal content between adjacent layers varies by 2% or more or 4% or more. The examiner notes that the applicant has not responded to the

examiner's assertion that it would be obvious to optimize and that the results of such optimization would be predictable.

In the applicant's examples shown in table 2, poor results are obtained when the metal content is not varied among the recording layers and where the metal content of layers nearer to the light incident plane are higher than those further from the light incident plane. The recording layers in these embodiments are thinner nearest the light incidence plane. Therefore, the results are consistent with the teachings of the prior art. Poor results are obtained when a thinner recording layer having a higher metal content is placed closer to the light incidence plane than a thicker layer having a low metal content. The applicant also has not shown unexpected results when the metal content of further layers are 2% or more or 4% or more when compared to instances when the metal content of the further layers is simply greater than the metal content of the layer/layers nearer to the light incidence plane.

Conclusion

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ANNA L. VERDERAME whose telephone number is (571)272-6420. The examiner can normally be reached on M-F 8A-4:30P.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on (571)272-1385. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Mark F. Huff/
Supervisory Patent Examiner, Art Unit 1795

/Anna L Verderame/
Examiner, Art Unit 1795